Common Logistics Command and Control System

Concept of Employment (CoE)

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Overview

Purpose

This document describes the concept of employment surrounding the Common Logistics Command and Control System (CLC2S). Specifically, it outlines how this logistics C2 system can be employed in both wartime operations and operations other than war to support and enhance logistics (friendly) situational awareness, tactical decision making and command management functions.

This Concept of Employment (CoE) was developed to assist in understanding, design, development and assessment efforts associated with this enabling capability. In addition, the CoE provides a basis for examining the warfighting contributions that CSS software tools, logistics situational awareness and logistics sensor systems provide. By describing how this enabling capability will be employed, we gain a better understanding of the design requirements, constraints and restraints. It is intended that this document will be used as the basis for examining the features provided by CLC2S in the areas of logistics (friendly) situational awareness, tactical CSS decision making, logistics command management functions, and the contributions that each makes on enhancing overall MAGTF warfighting effectiveness.

"The CoE provides a basis for examining the warfighting contributions that CSS software tools, logistics situational awareness and logistics sensor systems provide."

Scope

This Concept of Employment (CoE) provides preliminary background and information, a system overview, the operational concept, and a concept of employment within the context of each element of the MAGTF. The intent of this document is to articulate the warfighting contribution this enabling capability provides to enhance MAGTF effectiveness.

Objective

The importance of logistics to military planners cannot be overstated. Throughout history there exist countless examples of how superior strategy and firepower were either positively or negatively influenced by logistics planning and execution. A key goal of military strategists is to transform logistics capabilities so that they provide greater agility and speed to operational forces in the battlespace. In order to implement the concepts of Expeditionary Maneuver Warfare (EMW), the Marine Corps' warfighters and logisticians must maximize logistics capabilities by replacing the existing iron mountain of the logistics chain with an interoperable combat service support command and control system that enables them to support and sustain the operating forces more quickly and effectively with speed, agility and precision.

Historically, the logistics C2 was narrowly focused on task organization and types of mission (DS, GS) that could be assigned to a CSSE. But now, tenets of EMW (as well as logistics transformation initiatives) require a degree of agility and precision that is dependent on information and speed instead of mass. This means that now Log C2 must promote situational awareness of all logistics functions at all levels and provide commanders with the information needed to make timely and relevant decisions.

Logistics information must integrate logistics operations with maneuver, fires, intelligence and force protection operations. It must use comprehensive data from a variety of sources, accessible by a communication and information system architecture. This architecture provides the channel to request or coordinate service support and to report or monitor materiel status. However, in a deployed operational environment communications networks are highly taxed, severely limiting the volume of data that can be transmitted around the battlespace. This is compounded

by the fact that the bandwidth is shared with operational and intelligence data which often has a higher priority than logistics. The result is that in a tactical environment, logisticians have relied on manual coordination via white-boards and voice communications, in conjunction with several legacy stove-piped supply and maintenance systems that can be used in-theater. This dispersion of logistics data leads to an inaccurate and out of date Common Logistics Picture (CLP), hampering effective command and control decision-making.

The objective of the Common Logistics Command and Control System is to provide the Commander an automated, scalable, near-real time capability to plan, request, prioritize, task, monitor, and manage logistics resources. Through speed of information and exploitation of advanced technologies, CLC2S can integrate Supply, Personnel and Equipment Status in order to provide the situational awareness and enable the decision-making process required for logistics command and control. CLC2S will allow the commander to make timely and relevant decisions regarding logistics resources and capabilities.

Desired Outcomes

Once employed, CLC2S will provide the following capabilities:

- Provide a core automation system in support of the Combat Service Support Operations Center (CSSOC) and provide an integration of operational logistics situational awareness in the CSSOC and Combat Operations Centers (COC). This includes:
  - A rapid request tracking system that conforms with the tenets of the ILC Operational Architecture
  - The ability to monitor, track, prioritize and allocate logistics resources
- Support high tempo decision-making by providing the capability to build logistics support plans that are based on up to date, integrated resource status.
- Share data real time with legacy and emerging source of record systems.
- Operate in an un-tethered environment.

System Concept

Background

Logistics is one of the six warfighting functions necessary for the effective prosecution of war. Logistics Command and Control (C2) is fundamentally no different than any other aspect of C2 with the exception that the responsibilities, information requirements and management functions / tools may differ from the other elements of the MAGTF. CLC2S integrates the data from legacy systems and interfaces with presentation applications that are tailored in a manner consistent with the command hierarchy and mission needs of the unit. For instance, the logistics picture the CSSE may wish to view may reflect consumption, expenditures and inventory levels, while the MAGTF commander wishes to view vehicle and weapon system availability and health factors. Having a powerful logistics C2 capability can allow the MAGTF Commander to truly optimize his warfighting capability through increased situational awareness, improved synchronization and better utilization of critical resources.

Operational Concept

As defined in *MCDP 4, Logistics*, command and control of logistics capabilities links the distribution system to the planning and execution of operations. It is the means to ***ensure the effective employment of resources***. Logistics command and control aids the commander in accomplishing three essential tasks: anticipating future requirements, allocating resources, and dealing with uncertainty.

The two defining problems that command and control seeks to overcome are uncertainty and time. Command and control seeks to reduce the amount of uncertainty through situational awareness. However, reducing uncertainty comes with a cost – time. The challenge is to find the balance of reducing uncertainty with the minimum time. The operational concept for CLC2S is to enhance Marine Corps logistics C2 by providing a system that improves logistics situational awareness while reducing the decision-making cycle time.

The table below displays a matrix of characteristics and functionality required to support the three essential tasks of logistics C2 with the functions of planning and execution in order to achieve effective employment of resources:

"The operational concept for CLC2S is to enhance Marine Corps logistics C2 by providing a system that improves logistics situational awareness while reducing the decision-making cycle time."

Ensuring Effective Employment of Resources	Planning	Execution
Anticipating Future Requirements	• Visibility of current and forecasted asset status • Standard planning factors • Integrated tactical picture	• Request Management • Messaging/ Communication infrastructure • Alert Monitors

Ensuring Effective Employment of Resources	Planning	Execution
Allocating Resources	• Mission priorities • Mission planning • Asset Management • Inventory Management • Shared Data	• Order Management • Decision Support Tools • Course of Action analysis
Dealing with Uncertainty	• Situational Awareness of requirements and capabilities • Forecasting and collaborative planning • System Sensors, alerts	• Sensors, alerts • Visibility of assets • Feedback and assessment loops • Agility

CLC2S is deployed and employed at the operational and tactical level for planning and execution. The aggregation and processing of raw data and information provides the situational awareness required for decision-making. The initial employment concept is to install the CLC2S network so that the tactical units are capable of reporting on, monitoring, recording and alerting the commander on the position/location, operating performance and vehicle health/condition of critically tracked items (CTI), to include but not limited to weapon systems, vehicles, fuel, ordnance, subsistence and other critical warfighting resources.

This logistics status information forms the backbone of a shared data environment that when integrated with information resources contained in legacy based systems is transformed into logistic or friendly situational awareness presentations. Data is extracted, consolidated, transformed, aggregated and presented or displayed in a variety of formats that allow the commander better visualization of his friendly situation and thereby optimize his planning and employment. Consistent with this data access, commanders are able to more closely monitor critical warfighting assets and direct resources to obtain higher readiness and availability thresholds.

Information can be tailored and distributed throughout the MAGTF based on assigned missions and tasks, and when coupled alongside the tactical picture, the commander can immediately recognize a unit's warfighting status and take appropriate actions based on his battle plan. The CLC2S system will accompany and support Marine Forces throughout the planning, deployment, employment and redeployment cycles. CLC2S is a fundamental component of the Marine Corps GCSS framework providing the data population, integration and overlay for the GCCS / GCSS Common Operational Picture / Common Tactical Picture (COP/TOP).

System Description

CLC2S is in reality a system of systems that utilizes a variety of legacy-based logistics and tactical level applications.

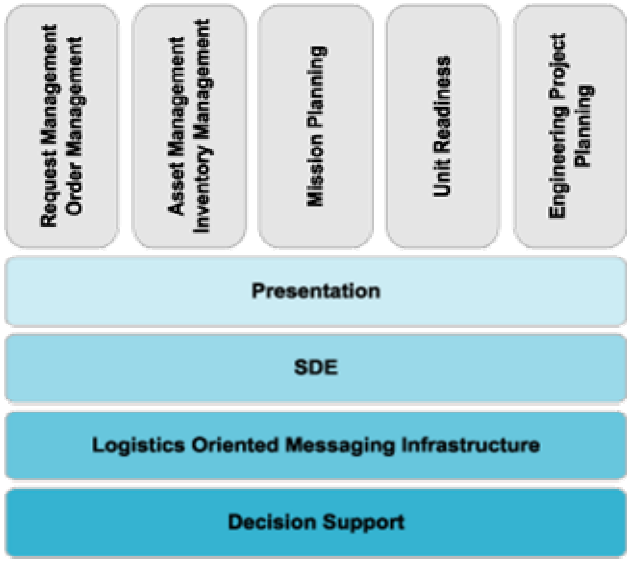
The system is designed to support and enhance Planning, Decision, Execution and Assessment (PDE&A) functions. The "system" consists of two interrelated elements – functional capabilities, and system capabilities.

Functional Capabilities

- A request management application. Provides execution for request management and order management functions.
- An asset management application. Provides execution for asset management and inventory management functions.
- A CSS mission planning and unit readiness application. Provides planning tools for developing and "what if-ing" mission requirements and includes decision and assessment functions for maintaining situational awareness of unit and asset readiness.
- An engineering project planning application. Provides the tools for developing engineering support mission requirements and plans.

System Capabilities

- Presentation capability. Provided via web, C2PC or handheld device.
- Shared Data Environment. Provides the capability for sharing data with legacy systems.
- Logistics oriented messaging infrastructure. Includes an un-tethered capability for messaging.
- Decision Support Tools. Provides the capability for knowledge management and for analysis and assessment of various planning and execution scenarios.



Each of these elements interfaces and interoperates with existing Marine Corps capabilities. The emphasis in this logistics C2 system is on the "operational", which is to highlight the intention or use of the data being collected, i.e., it contributes to the MAGTF's overall warfighting mission. Operational data, within the context of CLC2S, is both data and information that is logistical in nature but operationally relevant and therefore contributes to enhancing the warfighting mission of the MAGTF (i.e., inventory levels, position location, etc.) or it can be operational in that it is data directly related to the operational status or availability of vehicles and weapon systems (vehicle health, vehicle fuel levels, etc.).

CLC2S satisfies the near real-time need for resource status and availability. This results in increased friendly situational awareness and the ability to provide greater decision support via enhanced visibility of the MAGTF's warfighting status. The system provides the flexibility to set and deliver "alerts or triggers" based on the tactical situation. This attribute allows the MAGTF Commander and his subordinate commanders to be more proactive and

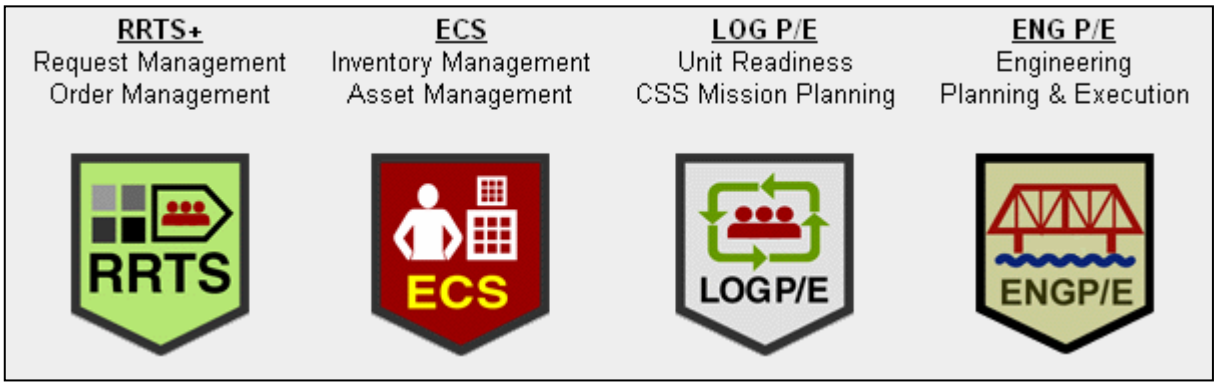
adjust tactics, dispatch recovery vehicles or fuel trucks, and take other proactive steps necessary to maintain tempo on the battlefield. The logistics status data is integrated with other information attributes extracted from the shared data environment to form a robust logistics situational awareness picture and the basis for a comprehensive CSS tool kit. This provides a number of different planning, execution and assessment tools to enhance decision making for the commander and his principal staff in the performance of combat service support.

The Un-tethered messaging infrastructure enables the features of the system to operate in an expeditionary manner, being available in degraded bandwidth environments. The system provides a flexible solution that can aggregate logistics visibility up the chain of command as well as direct execution to the appropriate support units. The architecture is compatible with existing Marine Corps and Navy communications devices operating over UHF, VHF, HF and SATCOM and provides robust compression and failover functionality.

Components and Transformation Characteristics

Components

The following are the four basic application components of CLC2S:



1. ***Rapid Request Tracking System Plus (RRTS+)***
   Provides request management and order management functionality. Allows designated users to create new requests for supplies and services and to monitor the status of submitted requests. Provides a single entry point for generating CSS requirements by a supported unit. Provides order management functionality by providing the capability to assign received requests for assignment and execution.

2. ***Enhanced CSSOC/COC System (ECS)***
   Provides asset management and inventory management functionality. Provides the capability to view and edit the status of personnel, equipment and supplies. Provides the capability to drill down within these categories in order to view status at the individual asset level (individual, serial number item or supply item by location).

3. ***Logistics Planning and Execution (Log P/E)***
   Provides the functionality to develop logistics missions and plans. Has individual modules that enable requirements determination for a mission, estimates of supportability, Course of Action (COA) development and analysis, preparation of a detailed plan for execution of a selected COA, and finally forecasting the effects of mission execution on unit readiness.

   This application also provides a unit readiness function. This function allows commanders to monitor readiness status of personnel, supplies and equipment based on criteria that the commander may select. This function also

allows the commander to define and insert system alerts when asset status approaches or falls below categories within the criteria.

4. ***Engineering Planning and Execution System (Eng P/E)***
   Provides the functionality to develop engineer support plans. This module allows a planner to develop a by name/skill list of project members. Like Log P/E it has individual modules that enable requirements determination for a project, estimates of supportability, Course of Action (COA) development and analysis, and preparation of a detailed plan for execution of a selected COA. This function also has the capability to archive project plans.

Transformation Characteristics

The following characteristics are instrumental to logistics transformation are inherent to CLC2S:

1. ***Web Based***
   CLC2S provides a baseline web enabled environment that can host all new functionality described in this document. The tools are useable with a minimum of training and are accessed with nothing on the user's computer other than an Internet browser.

2. ***Shared Data***
   CLC2S overcomes a critical shortcoming of the current Marine Corps logistics information network – a robust, deployable Shared Data Environment (SDE) that allows applications to easily share transactional data, and to provide aggregated data for use in decision support systems/tools. Additionally, CLC2S includes an un-tethered messaging infrastructure to support the data synchronization and replication of data from heterogeneous systems. This will leverage the current body of knowledge contained within existing data feeds system to cover such applications as SASSY, MIMMS, ROLMS, ATLASS I and ODSE. CLC2S provides a template for future integration with other systems that are either already fielded or in the process of being fielded (e.g., GCSS-MC). The solution can be extended for use in garrison by integrating with a COTS Enterprise Application Integration (EAI) package.

3. ***Handheld***
   CLC2S provides a handheld variant that is an incremental feature of the system, allowing the logistician to extend the reach of the applications beyond the desktop or laptop.

4. ***Calculation Factors***
   CLC2S performs sustainment calculations that are based on a wide range of parameters that can be input by the logistics planner. These include METT-T mission analysis factors such as weather, threat, tempo and force structure. Calculations are determined by standard sources such as OPLOG Planner, LOG 2000, MCRP 4-11A and FM 101-10-1/2. The system has the capability to use these factors to determine requirements by mission phase and for the entire mission. It also provides the ability to allow the planner to manipulate the factors based on experience, lessons learned, etc. In doing this, the planner can make changes to calculation at either the individual item level or for an entire class of supply. The system will also allow base data to be updated periodically enterprise wide as more optimal values are approved.

5. ***Asset Management***
   The current version of CLC2S provides logistics management for personnel assets, equipment assets and supply Class I (subsistence), Class III (fuel), and Class V (ammunition), TOAs, facilities, and assemblies. Assets can be managed down to the individual item level for execution and at the aggregate level for planning. The system also has the capability to expand to include other classes of supply.

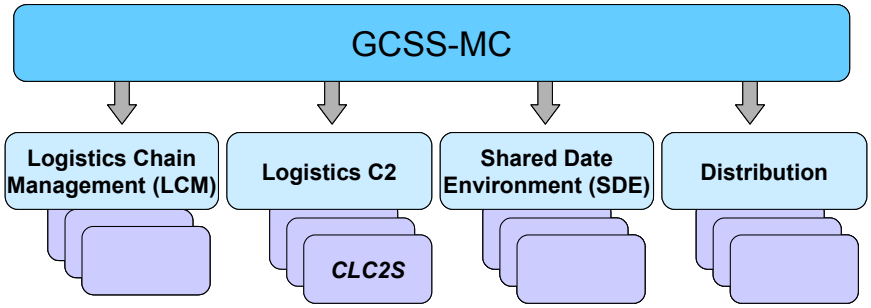
6. ***Reports and Orders***
   CLC2S has a basic publishing functionality that enables planners to develop logistics mission orders. This functionality receives input from mission parameters (weather, threat, tempo, force structure), requirements determination, asset availability and supportability. Such orders can be published on a CLC2S web site that ensures a single focal point and enables plan sharing. Additionally, CLC2S provides functionality to develop robust ad-hoc reporting based on individual commanders' requirements.

Support Concept

The CLC2S system resides within the overall MAGTF C4I infrastructure. DII/COE, JTA, MAGTF Software Baseline (MSB) and MAGTF C4ISR Integrated Package (MIP) standards and guidelines form the basis of the CLC2S system network. Configuration Management is the responsibility of Headquarters Marine Corps (HQMC) and Marine Corps Systems Command (MARCORSYSCOM). Changes/upgrades to the CLC2S system need to be approved, documented and verified by a Configuration Control Board (CCB) established by HQMC and MARCORSYSCOM in accordance with the MIP. The MARCORSYSCOM Program Manager, utilizing either Marine Corps resources (MCTSSA, MCLB Albany assets) or Contractor Operated Maintenance Support (COMS), will coordinate software/hardware support for minor fixes and changes. Using unit MOS 4066 personnel shall perform software installation and maintenance. The system will be modular to support accelerated fielding and improve maintainability and manageability.

System Relationships, Interfaces and Interoperability

The CLC2S system interfaces with and is interoperable with a number of different systems in order to fulfill its mission and perform the functions necessary to provide logistics (friendly) situational awareness. The system interoperates with current and planned communications links, tactical data networks and currently fielding Marine Corps hardware. CLC2S is a component of the Global Command Support System Marine Corps (GCSS-MC) portfolio as shown in the figure below.



System accuracy and relevance is dependent upon the synchronization and aggregation of data managed by disconnected users in forward positioned supporting units. This data is further merged and consolidated with data from various LOG-AIS systems such as MDSS II, SASSY, MIMMS, ATLASS, ROLMS, ODSE, etc. Once consolidated, the presentation can be displayed via a number of different applications to include injecting into C2PC as well as its own web-enabled interface.

Employment Options

CLC2S will be employed primarily to enhance/support logistics C2 at the tactical level. It has the capability to integrate with planning and execution at the operational level but at its essence, it is a MAGTF tool. The CLC2S system can be deployed throughout the MAGTF down to the battalion / squadron level and at designated detachments (e.g. CSSDs). The system will be deployed in conjunction with the task organization designated/built to support a particular mission or operation. The system should be employed as a subset of the tactical C2 architecture and provides the commander and his principal staff officers with enhanced visibility of the logistic (friendly) situation. This enhanced visibility provides commanders with the knowledge to more accurately access the tactical situation by merging near real-time friendly information with the enemy situation.

Logistics (friendly) situational awareness is required across the MAGTF from the MAGTF CE down through each major subordinate command and at those locations or units that maintain a COC / CSSOC. The capability resulting from CLC2S consists of planning and execution applications supported by a messaging infrastructure, shared data environment, presentation applications and decision support tools. CLC2S does not replace any existing system, nor is it a new C2 system, but rather an extension on our existing information network and a resource that supplements the current C2 architecture. What is new is its ability to integrate operational and logistics information to provide situational awareness and decision support.

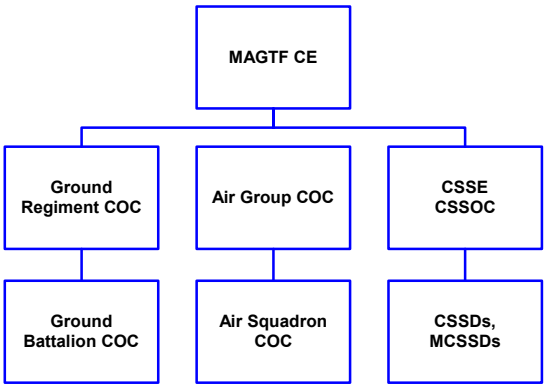
"The employment of logistics has two perspectives…it is important to understand this because it requires logistics C2 to generate a fulcrum to balance requirements with resources."

Raw logistics situational data is sent to a lightweight shared data environment where various applications are employed to extract, consolidate, transform, and aggregate the data. This data is then converted by the application into a presentation and displayed as a function of Logistics (friendly) situational awareness. Presentations can be tailored depending on the mission of the command receiving the information. For instance, the CSSE might decide that the presentation that is most critical is a view of both their asset visibility (Class I, III, and V) and the equipment status of organic critical low-density items like refuelers, wreakers, etc. The GCE, however, might decide that the view they want to see consists of vehicle and weapon system status, operating range, and Class V for tanks, LAVs, AAVs, etc. This allows the GCE Commander to know his actual warfighting capability and his capability to sustain this force before re-supply is required. On the other hand, the CSSE Commander can view the GCE status and begin to anticipate or predict demand, he can visualize the status of all units and can forecast resource allocations, surge operations, etc., and therefore, start taking proactive measures to ensure continuous uninterrupted support.

Data synchronization is critical to the development of a common logistics (friendly) situational awareness. The use of pre-set updates and equipment alerts can significantly support the real-time needs of the MAGTF commander as well as logistics commanders and their staffs. This information allows commanders and staffs with the means to perform more precise planning, execution, and monitoring of warfighting capabilities. The CLC2S system leverages the existing communications infrastructure wherever deployed and is scalable in that it can be deployed/employed in any size/configured MAGTF. The system interfaces, interoperates with and is compatible with the family of LOG-AIS systems, other tactical systems, the overall tactical communications architecture and is capable of interfacing with other Service systems.

Network Configuration

CLC2S needs to be planned for and configured into the MAGTF communications architecture/network for a specific deployment. Frequency allocation, bandwidth resources, SIPRNET/NIPRNET access, etc., are determined based on mission, tasks, command relations, and priority of effort. CLC2S software is capable of operating on MCHS equipment. Note that SIPRNET and/or NIPRNET access will affect network configuration, physical security requirements, and aggregation of data necessary to develop accurate and relevant logistics (friendly) situational awareness.

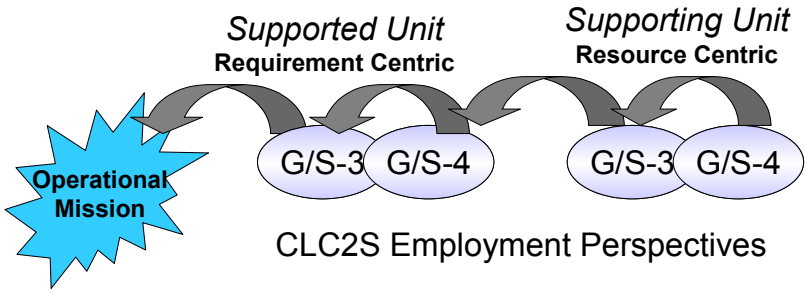


Employment Perspectives

The employment of logistics at the tactical level has two perspectives – the supported unit perspective and the supporting unit perspective. The supported unit is the end customer for the consumption of supplies and services. The supported unit generates requirements. The supporting unit provides the capabilities to meet the requirements. The employment perspective of the supported unit is mission requirement centric. For the supporting unit it is mission resource centric.

When the supported unit receives a mission, it conducts a METT-T (Mission, Enemy, Terrain and Weather, Troops and Support, and Time) based mission analysis. In regard to logistics, the unit uses this analysis to determine what it requires to operationally accomplish the mission organically. It then generates requirements for what it cannot accomplish organically and passes those to the supporting unit.

The supporting unit task organizes to meet the requirements generated by the supported unit. Its ability to meet the supported unit's requirements is a function of distribution and time/distance factors. In larger operations, the supporting unit will pass requirements that it cannot support to a higher-level supporting organization. (In this case, the supporting unit becomes in effect a supported unit. However, it maintains a supporting unit perspective because the focal point for supporting will always be the supported unit's mission.)



There are two reasons why this is important to understand in regards to logistics command and control. First, a logistics C2 system must have the agility to support both perspectives. Second, logistics C2 must generate a fulcrum. It must balance requirements (which may be unlimited) with resources (which will always be limited). When two organizations have different perspectives of the same situation, C2 must ensure that the two perspectives are focused on the same objective.

Within the MAGTF, generally the GCE and the ACE are the supported units and the CSSE is the supporting unit. The CE plays a critical role as the fulcrum by establishing the priorities and direction necessary to balance requirements with resources.

MAGTF CE

At this level the principal users will be the G/S-3 (Operations) and the G/S-4 (Logistics) of the MAGTF. The G/S-3 will make particular use of the system's ability to display the current status of commander's CTIs (equipment and supplies) and readiness status to monitor mission execution and to adjust course of actions. The G/S-4 will make particular use of the system to monitor sustainment status (i.e., DOS, DOA, throughput, equipment availability, etc.), review alternative sources of supply and recommend adjustments to safety levels, etc.

The G/S-4 will work closely with the CSSE to establish priorities, allocate resources, and source critical low-density items of supply. Through the use of the system alerts, the G/S-4 will be capable of accurately monitoring consumption and expenditure levels, track equipment readiness/availability and in conjunction with the G/S-3 correlate logistics issues with the Commander's operational/tactical objectives. The G/S-4 will also be capable of observing developing equipment and supply readiness issues and take appropriate actions to preclude any significant operational impacts.

The MAGTF Commander and his staff will have direct visibility into the data aggregated by CLC2S at the summary level by means of the C2PC Logistics Injector which overlays logistics situational awareness (friendly) onto the Common Operating Picture.

Through the use of the ECS, the MAGTF CE staff can monitor asset status and availability (personnel, supplies and equipment). This information is integrated with the Log P/E to monitor unit readiness and for establishing alerts for selected assets. Log P/E and Eng P/E also allow the MAGTF CE staff to develop mission plans to include requirements determination, estimates of supportability, course of action analysis, and plan preparation.

MAGTF GCE

The spectrum of users at this level is first defined by procedures established for the logistics operational architecture (OA), specifically for those that execute the role of Request Management. The system supports the ability to initiate and approve requests, monitor status, and make decisions about asset utilization and prioritization to the level that these tasks are accomplished within the GCE.

The spectrum of capabilities also supports responsibilities for analyzing missions in order to plan for and develop support estimates and requirements. At this level the principal users will be the G/S-3 (Operations) and the G/S-4 (Logistics). The G/S-3 will make particular use of the systems ability to display the current status of commander's CTIs (equipment and supplies) and readiness status to monitor mission execution and to adjust course of actions. The G/S-4 will make particular use of the system to monitor sustainment status (i.e., DOS, DOA, throughput, equipment availability, etc.), review alternative sources of supply and recommend adjustments to safety levels, etc.

The G-4 will work closely with the CSSE staff to establish priorities, allocate resources, and source critical low-density items of supply. Through the use of system alerts, the G/S-4 will be capable of accurately monitoring consumption and expenditure levels, track equipment readiness/availability and in conjunction with the G/S3 correlate logistics issues with the Commander's operational/tactical objectives. The G/S-4 will also be capable of observing developing equipment and supply readiness issues and take appropriate actions to preclude any significant operational impacts, such as executing the generation of rapid requests to the CSSE.

The G/S-1 (Personnel) will be a supplemental user of the system, making use of the ability of the system to display the current personnel status and to aggregate data from other personnel systems from which it can generate standard personnel reports as well as provide ad-hoc report generation capabilities.

As a prime supported unit, the GCE will be a principal user of RRTS+ to submit logistics requests. The GCE will use ECS to monitor assets status and availability. The GCE may also use Log P/E to establish alerts and develop mission plans.

MAGTF ACE

As a supported unit, the MAGTF ACE will employ the system similarly as the GCE. However, unlike the GCE, the ACE has organic CSS units within its structure – the Marine Wings Support Group (MWSG) and its subordinate Marine Wing Support Squadrons (MWSS). Because of this, within the ACE, OA nodes of Order Manager and Capacity Manager are also present. The extent of the role these functions have within the COE for CLC2S are further enumerated below under the CSSE.

Much the same as the GCE, the ACE will be a principal user of RRTS+ to submit logistics requests. The ACE will use ECS to monitor assets status and availability. The ACE may use Log P/E to establish alerts and develop mission plans. It will also potentially use Eng P/E to develop engineering plans for airfield engineering projects.

MAGTF Combat Service Support Element

The CLC2S system is designed for employment across the MAGTF; as such it provides the CSSE Commander and his staff with a significant tool to increase and enhance visibility of the force. The rapid and automated reporting of equipment and supply status significantly speeds up the reporting of information and reduces errors that may result from human induced mistakes. The rapid request functionality streamlines the execution of re-supply and service requests to a central CSSOC so that the various detachments involved in the fulfillment of the request are accountable to the requester via the CSSOC. This is in line with the ILC Operational Architecture for Combat Service Support.

As the supporting unit, the CSSE executes OA functions of Order Management, Capacity Management and Production Management. The employment of CLC2S extends through each of these nodes to the execution level (inventory, distribution, maintenance and procurement) of CSS tasks and assignments. Employment supports the ability to receive CSS requirements, assign taskings, and monitor, prioritize and manage taskings, assets and resources.

As with the GCE and the ACE, the employment of CLC2S also supports responsibilities for analyzing missions in order to plan for and develop support estimates and logistics requirements to support operational mission requirements.

By using the full spectrum of its capabilities, CLC2S transforms the CSSOC from a command center that relies on manual, text-based, static processes to one that provides automated, reliable, integrated situational awareness and decision support. With the introduction of the logistics (friendly) situational awareness picture, the CSSE is in a more informed position and can proceed to perform predictive or anticipatory logistics. Correlation of logistics status and issues with the overall MAGTF operational/tactical objective(s) allows for increased efficiencies and effectiveness. The availability of a CSS tool kit will allow the rapid and precise planning; execution and assessment of CSS related tasks.

The CSSE will be a user of the full suite of CLC2S. It will use RRTS+ to initiate its own logistics requests for submission to a supporting CSSE. It will use ECS to make taskings of CSS requirements and to monitor assets status and availability. The CSSE will use Log P/E to monitor unit and asset readiness as well as develop logistics mission plans. Finally, it will be a principal user of Eng P/E to develop engineering project plans.

Utilization Matrix

The table below shows a matrix of how the different applications would most likely be used within the MAGTF:

	MAGTF CE	GCE	ACE	CSSE
Planning	Log P/E Eng P/E	Log P/E	Log P/E Eng P/E	Log P/E Eng P/E
Execution		RTTS+	RRTS+	RRTS+ ECS

Operational Scenario

The best way to get a picture of the CLC2S logistics vision is to walk through a simple scenario that will highlight the benefits that CLC2S brings to the Marine Corps. The scenario describes the operations of a Marine Expeditionary Brigade (MEB) aboard six amphibious ships of the Expeditionary Strike Group (ESG) Wasp. The ESG and the MEB have been sent to provide a non-combatant evacuation operation (NEO) and other humanitarian assistance to a foreign capital that has experienced a series of terrorist attacks.

Planning

The capital is 65 miles inland. There is a small abandoned airfield along the coast. The ESG takes up station 20 nautical miles off shore of the airfield. There is a road network that comes within 2 miles of the airfield and provides good traffic ability to the capital.

The operation will be executed in three phases. During phase one, two reinforced infantry companies will be helo'd into the U.S. Embassy to conduct the NEO. A small detachment of BSSG Marines will accompany the infantry companies. They will be equipped with hand held devices that can submit any CSS rapid requests that may arrive. The CSS will be on call and flown in directly from the ships.

In phase two, a Combat Service Support Area (CSSA) will be established at the airfield. The CSSA will support the provisioning and distribution of support and supplies required for the Humanitarian Assistance.

In phase three, Humanitarian Assistance will be conducted and the force will be prepared to conduct any anti-terrorism actions that may be required.

The BSSG commander and his staff conduct their planning using the Mission Planner application within Log P/E. Following with the operational plan, they set up the mission in three phases, determine the requirements for each phase, develop alternative courses of action (COA), and then prepare a plan for execution based on the selected COA. Based on guidance from the MEB commander, the BSSG also identifies the assets required for the mission that will have alerts established and input the parameters for the alerts. From this, the BSSG knows what assets it will need for each of the three phases.

Execution

The BSSG Marines helo into the capital with the infantry companies. For the NEO, they monitor the status of health and comfort packs and ration supplemental sundries. The BSSG commander aboard ship is able to view the status of these supplies as the Marines ashore send status back to the ECS via their handheld devices. Upon request from the GCE, the BSSG detachment forwards a requirement for additional bottled water via RRTS+.

For phase two, the BSSG takes the requirements identified in Mission Planner, and using ECS, assigns assets (personnel, equipment and supplies) to be moved ashore for the CSSA being established at the abandoned airfield. The MEB's G-4 and G-6 staffs stand up a deployment server for the shore-based Marines, and populate it with current data. The machine is tied into the Tactical Data Network (TDN) for data replication, and the system administrators input information about other local servers, and replication plans. When the forces go ashore, the new server is transported with the BSSG detachment and begins serving it locally. Once the system is up and running, it examines its network conditions, to determine the most appropriate method of running data feeds. As the shore-based communications are currently being driven by satellite, communication is not an immediate problem, and the server initiates synchronization using the satellite link. The BSSG now has assets at the embassy, at the CSSA, in transit to the CSSA, and aboard ship. ECS allows the commander to monitor the status of assets at each of these locations.

Phase three was planned for 10 days. For the first six days, all goes very smoothly. The BSSG is able to maintain a minimal logistics footprint ashore because it is able to monitor the expenditure of assets very precisely via ECS. All new requirements are fulfilled expeditiously because the integration between RRTS+ and ECS allows the BSSG to make quick decisions on the optimal source for fulfilling the request, whether the assets be aboard ship or ashore. The tight integration between awareness, decision support, and order management systems allows the logistician to focus on what matters most to him, planning and making decisions, rather than having to track down accurate information, and running between systems and people to set up missions.

"Tight integration between awareness, decision support, and execution systems allows the logistician to focus on what matters most"

On the seventh day of the operation, the MEB is ordered to provide security for an imminent threat 75 miles south of the capital. The ESG will remain on station, but an infantry battalion is ordered to the threat location. The weather situation does not allow for these Marines to be helo'd to the threat so they must be moved by ground transportation. The MEB commander has been monitoring the status of assets via ECS and is able to determine that the BSSG already has trucks ashore that can be utilized. His staff works with the BSSG staff to determine if there are enough assets ashore to fulfill the requirement along with moving necessary supplies in one lift. Using Mission Planner, they determine that they can move the whole battalion and one DOS by making two trips within six hours. The MEB commander concurs with this COA and the mission is updated. The BSSG commander now has assets in four locations and movement along two lines of communication. Using all of CLC2S' communication assets, including handheld devices, he continues to maintain accurate, timely, decisive situational awareness.

During the security mission, the shore-based communications systems are degraded. The logistics backbone no longer has a connection between the Marines on the shore, and those off the coast. The system detects that it has lost its connection, and stores all changes in logistics status locally until the network becomes available. During this time, logisticians can plan based on projected consumption from last known levels, and update actual stocking levels manually until they have more accurate information from the units in question. Accurate and credible projections not only enable future visibility, but also enable planning when information is spotty/unavailable. This reduces the logistical damage that can be caused by a failed communications link, or a down server.

Through the final three days of the operation, the BSSG is stretched very thin as the weather continues to provide problems with movement by air. The BSSG maintains close vigilance of its scarce resources ashore. Using CLS2S' alerts functionality, the BSSG commander makes several very timely decisions regarding the redistribution of supplies ashore from the humanitarian mission to the security mission. The BSSG is able to do this successfully because it does not have to wait for requests – it can see when statuses reach a critical point. Through the publication of a Logistics Tasking Order (LTO), the BSSG commander communicates his priority of effort; and all of his staff, as well as those detachments ashore, are able to make adjustments and decisions that are only possible through the situational awareness that the LTO provides. This also allows the ACE S-4 to maintain an awareness that subsequently enables tight coordination for the small windows of availability for helicopter assets to be used.

Having plans available in real-time to anyone involved in a mission (instead of just planners) reduces ambiguity and allows supporting personnel to act appropriately without searching aimlessly for information. Information needed to execute a planned mission is stored in a central location and made available to any participating group. As stocking levels are depleted, the system sends alerts to logistics officers warning them of their degraded supply situation. After several hours have passed without action from the logistics staff, the system detects several stocking criticalities. The system is not only a passive information querying tool, it actively pushes relevant and important information to the right people, ensuring that the right people have the opportunity to make the right decisions.

System administrators on shore restore limited network connectivity via radio links. The system recognizes the new connectivity and restores data synchronization using the alternate data link. As the system synchronizes, manually

entered stocking-level projections are overwritten with the live data. A robust messaging backbone is critical for the success of any tactical information system, and the extensible infrastructure provided by CLC2S enables the utilization of a wide array of possible communications devices that best suit the mission profile.

After 10 days, both missions are successfully completed. All MEB personnel and assets are returned aboard ship. This process goes smoothly and quickly in part because the BSSG's planning assured that the backload would not involve a large cache of unused supplies.

Upon completion of the operation, the BSSG commander is able to do a very thorough after action scrub because of the historical data captured in CLC2S. This information will be extremely useful in developing future logistics plans, to include adjusting planning factors. And because of this, the next operation will be even more successful than the one just completed.

Appendix: Operational Concept Diagram

The Operational Concept Diagram picture below illustrates one possible employment of CLC2S in a deployed environment. In this scenario, both Marines and Naval Construction Forces are using the system jointly to gain an accurate logistics picture, enabling the commander to make more effective command and control decisions based on near real-time logistics information from the entire battle space.